

Occurrence of three species of mud shrimps in aquiculture ponds on Caribbean coasts of Venezuela and Colombia, with a redescription of *Upogebia omissago* Williams, 1993 (Decapoda: Upogebiidae)

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Abstract.—Three species of mud shrimps, *Upogebia brasiliensis*, *U. omissa*, and *U. omissago*, are reported from ponds maintained for the commercial culture of penaeid shrimps on the Caribbean coasts of Venezuela and Colombia, South America. *Upogebia omissago* is redescribed and illustrated based on sexually mature individuals collected from the ponds. Catalogued lots of each species collected are listed.

Three species of mud shrimps, *Upogebia brasiliensis* Holthuis, 1956, *U. omissa* Gomes Corrêa, 1968, and *U. omissago* Williams, 1993 have been found in discrete or intermingled populations in ponds maintained for the commercial culture of penaeid shrimps on the Caribbean coasts of Venezuela and Colombia, South America. The ponds are stocked by pumping or flooding with seawater at appropriate tidal stages, and numerous organisms, including larvae and perhaps juveniles of the mud shrimps, are introduced with the incoming water. Upon attainment of the juvenile stage, the mud shrimps burrow into substrate of the ponds. Supplemental aquicultural feeding promotes growth of the cultured penaeid shrimps as well as the mud shrimps, producing sexually mature individuals of the latter in at least some cases.

The description of *Upogebia omissago* Williams, 1993 was based on only five subadult specimens from Luis Correia, Praia do Coqueiro, Piauí, northeastern Brazil. Now that larger fully mature specimens are available which exhibit features not completely developed in the originally described type series, the description can be emended. Remarks on other upogebiid species that occur in these ponds are included.

Specimens examined are deposited in the crustacean research collections of the National Museum of Natural History, Smithsonian Institution, Washington, D.C., (USNM), and the University of Southwestern Louisiana Department of Zoology, Lafayette (USLZ).

Upogebia omissago Williams, 1993 Fig. 1

Material studied.—Venezuela: USNM 251468, 6 ♂, 2 ♀ ovig., shrimp farm “Siembra Mar,” approximately 3 km from airport of Barcelona [Estado Anzoátegui], from R. Lemaitre, 27 Oct 1992. USLZ 3581, 1 ♂, 3 ♀ ovig., “Siembra Mar,” pond 09, coll. Sergio Nates, 16 Dec 1992; USLZ 3583, 3 ♀, same, 14 Jun 1994; USLZ 3586, 5 ♂, 5 ♀, same, coll. Eduardo Viso, Apr 1993. Blanco Rambla (1995) also listed *U. omissago* from this locality.

Diagnosis.—Projections to either side of rostrum ending in acute spine. Postocular spine present. Abdominal sternites unarmed. Telson subrectangular. Carpus of cheliped with 1 long strong inferior spine and 1 short strong spine above it on mesiodistal margin. Merus of pereopod 2 bearing 1 proximal mesioventral spine and 1 subdistal dorsal spine; merus of pereopod 3

with 1 subdistal dorsal spine; merus of pereopod 4 spineless.

Description.—Rostrum triangular, short, basal width greater than median length; straight to slightly downcurved in lateral view; tip exceeding eyestalks; dorsal pair of strong subapical spines followed on each side by 2–3 remote spines and spine mesial to them at base; rostral armature merging with field of similar spines on flattened anterior cephalothoracic shield, all spines hidden in dense cover of setae anteriorly, but spines less strongly developed and setae less dense posteriorly; median area of rostrum spineless but obscured by setae; spine field abruptly ending posteriorly and followed by smooth gastric region with narrowing median extension reaching anteriorly between armed area to either side; posteriorly divergent lateral ridge bearing crest of 13–15 spines and setae, strongest on process lateral to rostrum and decreasing posteriorly. Shoulder lateral to cervical groove bearing 1–2 blunt or acute tubercles below intersection with thalassinidean line, latter continuing to posterior margin of carapace. Postocular spine present.

Abdominal sternites unarmed.

Telson subrectangular, low transverse proximal ridge confluent with inconspicuous lateral ridge at either side.

Eyestalk stout, deepest at about midlength in lateral view, slightly concave dorsally, convex ventrally, horizontal to obliquely erect in repose; prominent terminal cornea narrower than diameter of stalk; few tiny spiniform tubercles or spinules scattered on mesiodorsal aspect of stalk posterior to cornea, and ventral margin variably smooth or bearing 1–2 obsolescent spines, occasionally with single well-developed spine near cornea.

Antennular peduncle reaching to about midlength of terminal article of antennal peduncle; proximal 2 articles together longer than terminal article.

Antennal peduncle with less than $\frac{1}{2}$ its length extending beyond tip of rostrum; ar-

ticle 2 bearing slender subdistal ventral spine; scale moderate, oval.

Maxilliped 3 bearing epipod.

Epistomial projection rather broad in lateral view, usually bearing 2 small unequal apical spines, sometimes 1 spine.

Chelipeds with ventral margin of ischium bearing 1–2 spines. Merus with row of 5–6 spines on ventral margin; single subdistal dorsal spine reaching level of postocular spine. Carpus trigonal, shallow longitudinal groove laterally, strong spine at anterior ventrolateral corner preceded by 1–2 spines; mesiodorsal crest of 6–9 crowded small spines, partly obscured by setae, in irregular row behind prominent dorsal spine on anterior margin, row flanked by 1 or 2 spines laterally and cluster of spines at proximal end mesially, and 4–6 short spines obscured by setae on anterodorsal margin mesial to articulation with propodus; 1 strong spine near middle of antero-mesial margin, shorter stout spine dorsal to it, and strong slender spine at distoventral corner. Chela length about 2.6–3.2 times chela height; spineless dorsal ridge terminating anteriorly near stout subdistal spine mesial to it, ridge not always uniformly straight; mesiodorsal row of about 8–15 small spines beginning with more or less erect spines proximally that tend to cluster at either side of row and become obsolescent at about $\frac{2}{3}$ – $\frac{3}{4}$ length of row; similar but more defined row of tubercles or spines below this row on upper mesial surface; distomarginal spine on mesial dactylar condyle and row of smaller spines ventral to it on distal margin; spine below lateral dactylar condyle; lower mesial surface of palm with obsolescent spines scattered or tending to form a row, and a few setae; sinuous row of crowded tubercles along proximomesial margin. Fixed finger shorter than dactyl and more slender, though stout in basal $\frac{2}{3}$, slightly downcurved at juncture with palm and tapering abruptly to slender tip; prehensile edge with 4–5 teeth; not as well developed in female as in male. Dactyl longitudinally ridged and setose; that of male

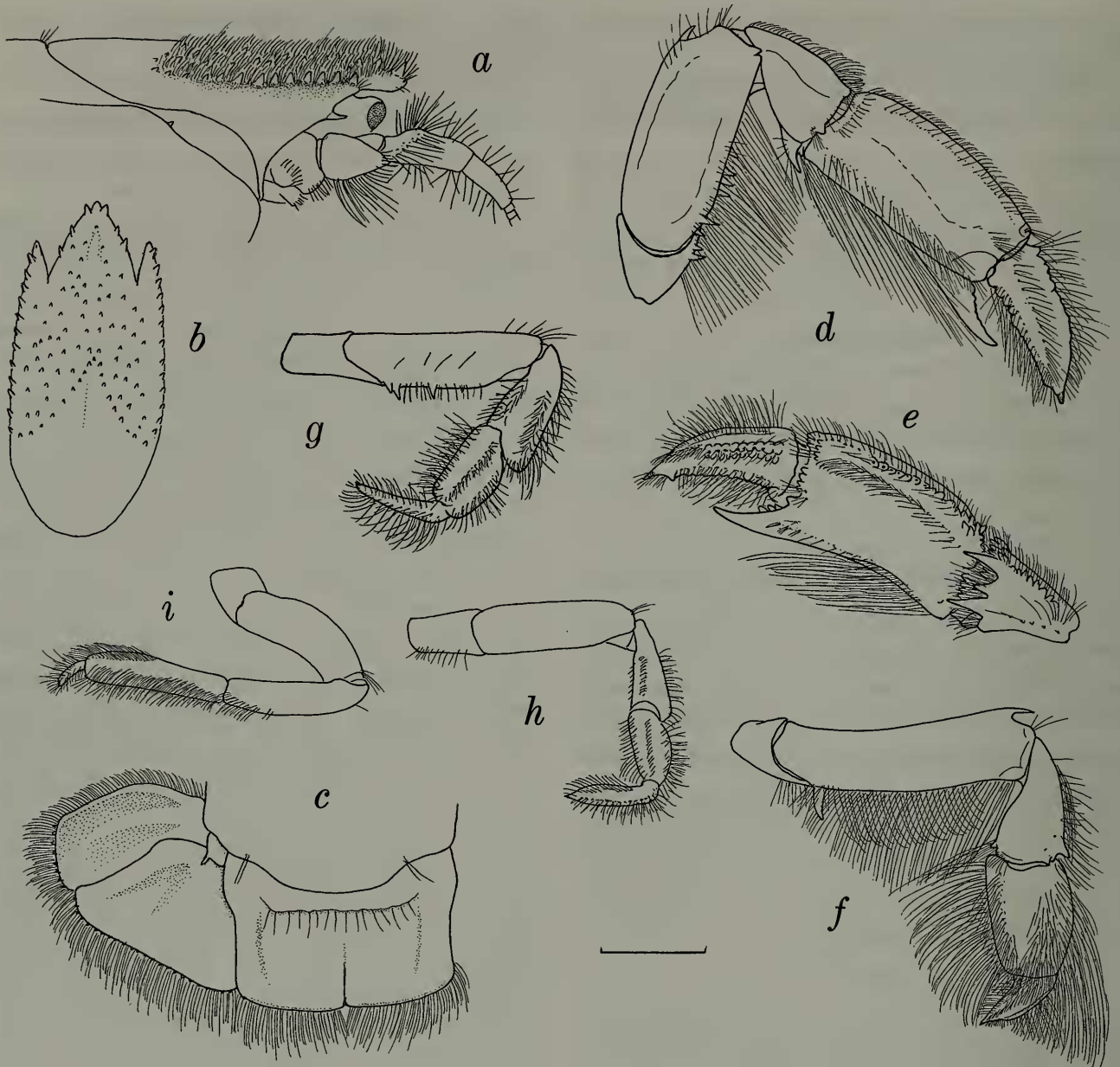


Fig. 1. *Upogebia omissago*, USNM 251468, ♀, *a*, cephalic region, lateral; *b*, anterior carapace, dorsal; *c*, parts of abdominal segment 6, telson, and uropods, dorsal; *d*, cheliped, right lateral; *e*, chela and carpus, right mesial; *f-i*, pereopods 2-5. Scale = 3 mm.

with corneous tip preceded on prehensile edge by strong tooth, followed by multi-dentate crest bracketed on proximal end by larger tooth, and toothless section basally; concave mesial aspect in both sexes bearing 2 unequal rows of subcircular flattened and crowded tubercles, most numerous in upper row.

Pereopod 2 reaching about to midlength of palm; carpus with acute distodorsal spine and smaller subdistal ventral spine; merus bearing slender subdistal dorsal spine and strong proximal mesioventral spine. Merus

of pereopod 3 with 0-1 slender distodorsal spine and ventral spines tending to cluster near ischio-meral articulation; ischium unarmed; coxa of female with low spine lateral to gonopore, that of male with smaller gonopore, its functional status uncertain. Pereopod 4 with merus unarmed. Pereopod 5 unarmed.

Uropod with acute spine on protopod above base of mesial ramus; mesial rib of lateral ramus bearing smaller acute proximal spine, distal margin of both rami bearing close-set row of tiny spines and spini-

form granules except for short mesial sector on each.

Measurements in mm.—Selected specimens larger than in type series; ♂, anterior carapace length 10.2, carapace length 14.7, chela length 8.3, chela height 3.1; ♂, same, 11.4, 16.6, 11.5, 5.1; ♀, same, 9.2, 13.7, 7.4, 2.3.

Remarks.—*Upogebia omissago* from the Venezuelan shrimp ponds attains a larger size and is more variable in morphology than specimens in the type series from a single locality in northeastern Brazil. To comparative remarks by Williams (1993), the following should be added. The species is similar to *U. vasquezii* Ngoc-Ho, 1989 (distributed from SE Florida to Brazil) in having two spines on the anteromesial margin of the carpus of the cheliped and in having spines on the lower mesial face of the chela palm, but in *U. omissago* the latter are relatively small and either scattered or in a weakly developed row compared to stronger, well aligned spines on *U. vasquezii*. *Upogebia omissago* resembles *U. careospina* Williams, 1993 (known from Ceará, Brazil) in having the dorsal ridge of the chela spineless, but spines or tubercles in the mesiodorsal rows are far less numerous than in *U. careospina*. *Upogebia omissago* differs from both of the above congeners in having the carpus of the cheliped armed with a crest of numerous dorsal spines flanked by 1 or 2 supernumerary lateral spines and a cluster of crowded mesial spines at the proximal end of the row. Each of these species has a spineless merus on pereopod 4. Rostral and adjacent dorsal spines are relatively stronger on *U. omissago* than in the others, and the spineless gastric area is far more abruptly defined, with the anterior median spineless extension being characteristic of *U. omissago*. Finally, only in *U. omissago* are there tiny mesiodorsal-ventral spinules and sharp tubercles on the eyestalks, and sharp tubercles on the shoulder of the cervical groove below its juncture with the thalassinidean line.

Notes.—Occurrence of other species of

Upogebia taken from burrows in penaeid shrimp culture ponds on the Caribbean coasts of Venezuela and Colombia are as follows.

Upogebia brasiliensis Holthuis, 1956: USLZ 3580, 2♂, 1♀ ovig., shrimp farm “Siembra Mar,” approximately 3 km from airport of Barcelona [Estado Anzoátegui], Venezuela, coll. Eduardo Viso, Aug. 1993; USLZ 3582, 3♀, same, coll. Eduardo Viso, Aug 1993; USLZ 3586, 1♀, same, coll. Eduardo Viso, Apr 1993 (occurring with *U. omissago*).

Upogebia omissa Gomes Corrêa, 1968: USNM 251469, 4♂, 1♀ ovig., shrimp farm: Colombiana de Acuicultura, S.A., pond P15, Bahía de Barbacoas, Cartagena, Colombia, coll. Sergio F. Nates, 4 Feb 1992, yabby pump; USLZ 3584, 1♂, 2♀ ovig., shrimp culture pond, Universidad de Oriente, Isla de Margarita, Venezuela, coll. E. Viso & O. Pichardo, 23 Jul 1994; USLZ 3588, 2♀ ovig., same, coll. E. Viso, O. Pichardo, S. Nates, 23 Jul 1994; USLZ 3585, 1♀, “Colombiana” shrimp farm, Cartagena, Colombia, coll. D. L. Felder, 26 Oct 1992; USLZ 3587, 2♂, 2♀ ovig., 1 juv., Parque Nacional Mochima, Chimana Grande, La Ensenada, Venezuela, coll. S. Nates, 26 Dec 1993.

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